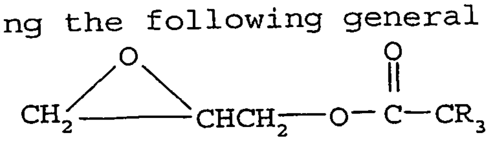
CLAIMS

1. Process for producing a tyre, which includes:
   - feeding an elastomeric composition to an extruder;
   - forming by extrusion said elastomeric composition as a continuous elongated element;
   - depositing said continuous elongated element on a support in a plurality of coils to make up a structural element of a tyre;

   wherein the step of forming is carried out at a shear rate of at least 1000 s^{-1} and the elastomeric composition comprises at least one elongational viscosity reducing additive in an amount so that elongational viscosity of said elastomeric composition, measured at 120°C, at the shear rate of the forming step, is at least 10% lower with respect to the elongational viscosity, measured in the same conditions, of the elastomeric composition devoid of said additive.
2. Process for producing a tyre according to claim 1, wherein the elongational viscosity of the elastomeric composition, measured at 120°C, at the shear rate of the forming step, is 15% lower with respect to the elongational viscosity, measured in the same conditions, of the elastomeric composition devoid of said additive.
3. Process for producing a tyre according to claim 1 or 2, wherein the elongational viscosity of the elastomeric composition, measured at 120°C, at the shear rate of the forming step, is not lower than 50% with respect to the elongational viscosity, measured in the same conditions, of the elastomeric composition devoid of said additive.
4. Process for producing a tyre according to any one of the preceding claims, wherein the support is a rotating support.

5. Process for producing a tyre according to any one of the preceding claims, wherein the support is a rigid support.
6. Process for producing a tyre according to claim 5, wherein the rigid support has a toroidal shape.
7. Process for producing a tyre according to any one of the preceding claims, wherein the process is carried out with a drawing ratio (K) higher than 1.
8. Process for producing a tyre according to claim 7, wherein the drawing ratio (K) is higher than 1.5.
9. Process for producing a tyre according to any one of the preceding claims, wherein the forming step is carried out at a shear rate of between 2000 s^{-1} and 8000 s^{-1}.
10. Process for producing a tyre according to claim 9, wherein the forming step is carried out at a shear rate of between 4000 s^{-1} and 6000 s^{-1}.
11. Process for producing a tyre according to any one of the preceding claims, wherein the elongational viscosity reducing additive is selected from:
    (a) glycidyl esters of an α-branched carboxylic acid containing from 6 to 22 carbon atoms;
    (b) polyolefin waxes;
    (c) copolymers of ethylene with at least one aliphatic α-olefin, and optionally a polyene;
    (d) thermoplastic polymers having a main hydrocarbon chain to which hydrophilic groups are linked;
    (e) fatty acid esters derived from at least one saturated or unsaturated fatty acid having from 8 to 24 carbon atoms and at least one polyhydric alcohol having from 2 to 6 carbon atoms.
12. Process for producing a tyre according to claim 11, wherein the glycidyl esters (a) are selected from those having the following general formula (I):



(I)

wherein the R groups, equal or different from each others, represent hydrogen or linear or branched aliphatic groups, with the provisio that the R groups have a total number of carbon atoms of from 6 to 18.

13. Process for producing a tyre according to claim 11, wherein the polyolefin waxes (b) are selected from homopolymers of an α-olefin or copolymers of at least two α-olefin such as ethylene, propylene, 1-butene, 1-hexene, 4-methyl-1-pentene, 1-decene, or mixtures thereof, having an intrinsic viscosity (η), measured at 135°C in decalin, of between 0.03 dl/g to 1.0 dl/g.

14. Process for producing a tyre, according to claim 13, wherein the polyolefin waxes (b) have a molecular weight distribution (MWD) index of less than 5.

15. Process for producing a tyre, according to claim 13 or 14, wherein the polyolefin waxes (b) have a number-average molecular weight of less than 4000.

16. Process for producing a tyre, according to any one of claims 13 to 15, wherein the polyolefin waxes (b) have a melting point (T_m) of less than 140°C.

17. Process for producing a tyre, according to any one of claims 13 to 16, wherein the polyolefin waxes (b) have a viscosity at 140°C, measured according to ASTM standard D3236-88, of less than 160 cps.

18. Process for producing a tyre, according to any one of claims 13 to 17, wherein the polyolefin waxes (b) are polyethylene wax, or ethylene α-olefin copolymer waxes.

19. Process for producing a tyre, according to claim 11, wherein the copolymer of ethylene (c), has a molecular weight distribution (MWD) index of less than 5 and a melting enthalpy (ΔH_m) of not less than 30 J/g.

20. Process for producing a tyre according to claim 19, wherein in the copolymer of ethylene (c) the aliphatic α-olefin is an olefin of formula CH_2=CH-R,

in which R represents a linear or branched alkyl group containing from 1 to 12 carbon atoms.

21. Process for producing a tyre according to claim 20, wherein the aliphatic α-olefin is selected from propylene, 1-butene, isobutylene, 1-pentene, 4-methyl-1-pentene, 1-hexene, 1-octene, 1-dodecene, or mixtures thereof.

22. Process for producing a tyre according to claim 21, wherein the aliphatic α-olefin is 1-octene.

23. Process for producing a tyre according to any one of claims 19 to 22, wherein the polyene is a conjugated or non-conjugated diene, triene or tetraene.

24. Process for producing a tyre according to claim 23, wherein the polyene is a diene.

25. Process for producing a tyre according to any one of claims 19 to 24, wherein the copolymer of ethylene (c) has a density of between 0.86 g/cm^3 and 0.93 g/cm^3.

26. Process for producing a tyre according to any one of claims 19 to 25, wherein the copolymer of ethylene (c) has a Melt Flow Index (MFI), measured according to ASTM standard D1230-00, of between 0.1 g/10 min and 35 g/10 min.

27. Process for producing a tyre according to any one of claims 19 to 26, wherein the copolymer of ethylene (c) has a melting point of not less than 30°C.

28. Process for producing a tyre according to claim 11, wherein in the hydrophilic polymers (d) the hydrophilic groups are selected from:
- hydroxyl groups -OH;
- carboxylic groups -COOH, possibly at least partially in the salt form;
- ester groups -COOR (R = alkyl or hydroxyalkyl);
- amide groups $-CONH_2$;
- sulfonic groups $-SO_3H$, possibly at least partially in the salt form.

29. Process for producing a tyre according to claim 28, wherein the hydrophilic polymers (d) are capable of absorbing at least 0.1% by weight of water based on the polymer weight after a 24-hour exposure in an environment having a 50% relative humidity at the temperature of 24°C (measured according to ASTM standard D570).
30. Process for producing a tyre according to claim 28 or 29, wherein the hydrophilic polymers (d) have a melting temperature lower than 230°C.
31. Process for producing a tyre according to any one of claims 28 to 30, wherein the hydrophilic polymers (d) are selected from: polyacrylic acid, polymethacrylic acid, polyhydroxy-alkylacrylate, polyalkylacrylate, polyacrylamide, acrylamide/acrylic acid copolymers, polyvinylalcohol, polyvinylacetate, vinylalcohol/vinylacetate copolymers, ethylene/vinylacetate copolymers, ethylene/vinylalcohol copolymers, ethylene/vinylalcohol/vinylacetate terpolymers, polyvinylsulfonic acid, polystyrene sulfonate, or mixtures thereof.
32. Process for producing a tyre according to any one of claims 28 to 31, wherein the hydrophilic polymers (d) comprise repeating units having the following formula (II):

$$-CH_2-\underset{\displaystyle OH}{\underset{|}{CH}}- \quad (II)$$

with a random or block distribution along the chain.
33. Process for producing a tyre according to any one of claims 28 to 32, wherein the hydrophilic polymers (d) are selected from:
   (i) vinylalcohol polymers obtained by hydrolysis of polyvinylacetate, with a hydrolysis degree comprised between 50 mol% and 100 mol%;

(ii) ethylene/vinylalcohol copolymers having a content of ethylene units comprised between 20 mol% and 60 mol%.

34. Process for producing a tyre according to claim 11, wherein in the fatty acid esters (e), the saturated fatty acid are selected from: capric acid, lauric acid, myristic acid, palmitic acid, stearic acid, 12-hydroxystearic acid, behenic acid, or mixtures thereof.

35. Process for producing a tyre according to claim 34, wherein the saturated fatty acid is stearic acid.

36. Process for producing a tyre according to claim 11, wherein in the fatty acid esters (e), the unsaturated fatty acid are selected from: undecylenic acid, oleic acid, erucic acid, sorbic acid, linoleic acid, linolenic acid, arachidonic acid, propiolic acid, stearolic acid, or mixtures thereof.

37. Process for producing a tyre according to any one of claim 34 to 36, wherein in the fatty acid esters (e), the polyhydric alcohol may be selected from: ethylene glycol, diethylene glycol, triethylene glycol, propylene glycol, dipropylene glycol, butanediol, pentanediol, hexanediol, glycerin, diglycerin, triglycerin, pentaerythritol, sorbitan, sorbitol, mannitol, or mixtures thereof.

38. Process for producing a tyre according to claim 37, wherein the polyhydric alcohol is glycerine.

39. Process for producing a tyre according to any one of the preceding claims, wherein the elongational viscosity reducing additive is present in the elastomeric composition in an amount of from 0.1 phr to 10 phr.

40. Process for producing a tyre according to claim 39, wherein the elongational viscosity reducing additive is present in the elastomeric composition in an amount of from 2 phr to 5 phr.

41. Process for producing a tyre according to any one of

the preceding claims, wherein the elastomeric composition comprises at least one diene elastomeric polymer (f).

42. Process for producing a tyre according to claim 41, wherein the diene elastomeric polymer (f) has a glass transition temperature (T_g) below 20°C.

43. Process for producing a tyre according to claim 42, wherein the diene elastomeric polymer (f) is selected from: cis-1,4-polyisoprene, 3,4-polyisoprene, polybutadiene, optionally halogenated isoprene/isobutene copolymers, 1,3-butadiene/acrylonitrile copolymers, styrene/1,3-butadiene copolymers, styrene/isoprene/1,3-butadiene copolymers, styrene/1,3-butadiene/acrylonitrile copolymers, or mixtures thereof.

44. Process for producing a tyre according to any one of the preceding claims, wherein the elastomeric composition comprises at least one elastomeric polymer of one or more monoolefins with an olefinic comonomer or derivatives thereof (g).

45. Process for producing a tyre according to claim 44, wherein the elastomeric polymer (g) is selected from: ethylene/propylene copolymers (EPR) or ethylene/propylene/diene copolymers (EPDM); polyisobutene; butyl rubbers; halobutyl rubbers; or mixtures thereof.

46. Process for producing a tyre according to any one of the preceding claims, wherein at least one reinforcing filler is present, in an amount of between 0.1 phr and 120 phr, in the elastomeric composition.

47. Process for producing a tyre according to claim 46, wherein the reinforcing filler is carbon black.

48. Process for producing a tyre according to claim 46, wherein the reinforcing filler is silica.

49. Process for producing a tyre according to claim 48, wherein at least one coupling agent is present.

50. Method for reducing the elongational viscosity of an elastomeric composition which comprises to add to said elastomeric composition at least one elongational viscosity reducing additive in an amount so that elongational viscosity of said elastomeric composition, measured at 120°C, at a shear rate of at least 1000 s^{-1}, is at least 10% lower with respect to the elongational viscosity, measured in the same conditions, of the elastomeric composition devoid of said additive.

51. Method for reducing the elongational viscosity of an elastomeric composition according to claim 50, wherein the elongational viscosity of the elastomeric composition, measured at 120°C, at a shear rate of at least 1000 s^{-1}, is 15% lower with respect to the elongational viscosity, measured in the same conditions, of the elastomeric composition devoid of said additive.

52. Method for reducing the elongational viscosity of an elastomeric composition according to claim 50 or 51, wherein the elongational viscosity of the elastomeric composition, measured at 120°C, at a shear rate of at least 1000 s^{-1}, is not lower than 50% with respect to the elongational viscosity, measured in the same conditions, of the elastomeric composition devoid of said additive.

53. Method for reducing the elongational viscosity of an elastomeric composition according to any one of claims 50 to 52, wherein the elongational viscosity reducing additive is defined according to any one of claims 11 to 40.

54. Method for reducing the elongational viscosity of an elastomeric composition according to any one of claims 50 to 53, wherein the elastomeric composition comprises at least a diene elastomeric polymer (f) which is defined according to any one of claims 41 to 43.

55. Method for reducing the elongational viscosity of an elastomeric composition according to any one of claims 50 to 54, wherein the elastomeric composition comprises at least one elastomeric polymer of one or more monoolefins with an olefinic comonomer or derivatives thereof (g) which is defined according to claim 45.

56. Method for reducing the elongational viscosity of an elastomeric composition according to any one of claims 50 to 55, wherein the elastomeric composition comprises at least one reinforcing filler, in an amount of between 0.1 phr and 120 phr.

57. Method for reducing the elongational viscosity of an elastomeric composition according to claim 56, wherein the reinforcing filler is defined according to any one of claims 47 to 49.